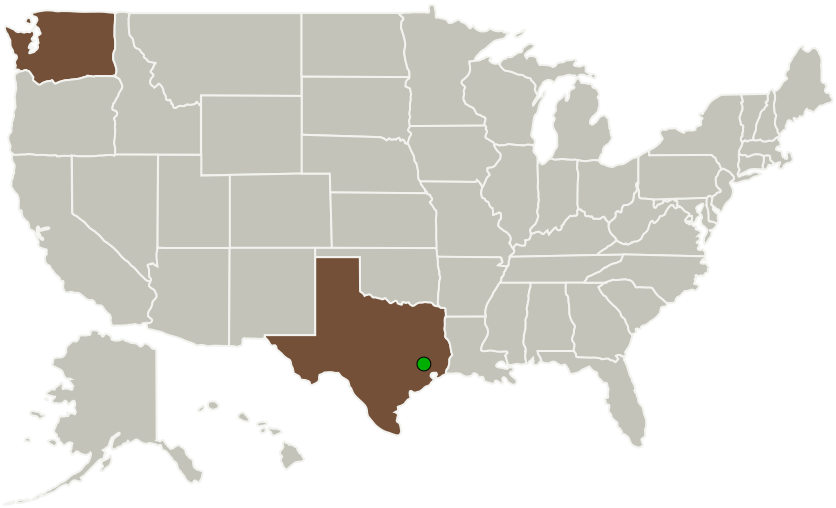
Deft Control Software (DCS) for Remote Robotic Operations with Underlying Structure, Phase I

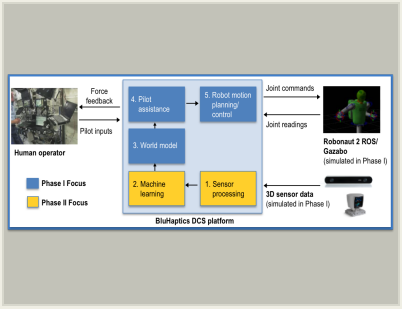
Completed Technology Project (2017 - 2017)

Project Introduction

BluHaptics proposes Deft Control Software (DCS), which utilizes machine learning to enable intuitive and efficient control of robotic arms in remote operations with underlying structure. The human-centered control methodology utilizes 3d sensor fusion for workspace visualization, machine learning with on-the-fly training, and pilot assist features to garner operator trust, improve safety, mitigate training latency, and support rapid task switching. The integrated algorithms identify and track underlying structure to enable pilot assistance and other safety features such as collision avoidance. DCS utilizes a common interface across robotic platforms and supports variable levels of autonomy specific to each task and/or operator. DCS permits robotic execution of exceedingly complex tasks that require high-levels of cognition and precise motor control which, to date, have been intractable for purely manual or automated control schemes to accomplish. The overall Phase I and II objectives are to: (1) demonstrate the value of a DCS interface to support intuitive manual control for remote operations, (2) demonstrate 3d visual-feedback and operator assistance supported by machine learning for tasks with underlying structure and varying levels of complexity, and (3) demonstrate the DCS platform can be extended to support different classes of robots with varying levels of autonomy. The objectives specific to Phase I are to: (1) Demonstrate intuitive manual control of a simulated NASA robot, (2) mitigate program risk by demonstrating basic assistive features, and (3) refine Phase II technical objectives based on collected user feedback and specific scenario requirements.

Primary U.S. Work Locations and Key Partners





Deft Control Software (DCS) for Remote Robotic Operations with Underlying Structure, Phase I Briefing Chart Image

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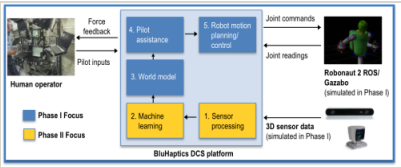
Organizations Performing Work	Role	Type	Location
BluHaptics, Inc.	Lead Organization	Industry	Seattle, Washington
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Texas	Washington

Images



Briefing Chart Image
Deft Control Software (DCS) for Remote Robotic Operations with Underlying Structure, Phase I Briefing Chart Image *(https://techport.nasa.gov/image/128241)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
BluHaptics, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

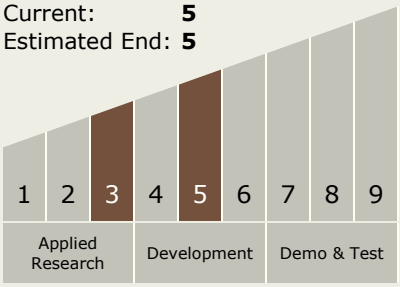
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Fredrik Ryden

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.4 Human-Robot Interaction
    - TX04.4.1 Multi-Modal and Proximate Interaction